

ACUTE TOXICITY TO FISH (FATHEAD MINNOW)

TEST SUBSTANCE

Identity: A mixture containing perfluorooctanesulfonate, which may also be referred to as PFOS, FC-95, or as a component of FC-603F. (1-Octanesulfonic acid) (CAS # 2795-39-3).

Remarks: The 3M production lot number was 501. The test sample is FC-603F. Current information indicates it is a mixture of 0.5% PFOS, 7% diethylene glycol butyl ether, 82.95% water, 2% acrylic foamer, 4% Alkylether sulfate, 1.45% Xanthan gum, 1.4% calcium acetate, 0.07% N-(3-Chloroallyl)hexaminium chloride, 0.5% triethanolamine, 0.05% sodium hydroxide, 0.03% cis-1-(3-Chloroallyl)-3,5,7-triaza-1-azoniaadamantane chloride, and 0.05% tolyltriazole.

The following summary applies to a mixture with incompletely characterized concentrations of impurities. Data may not accurately reflect the toxicity of the fluorochemical component of the test sample.

METHOD:

Method: OECD Guideline 203.

Type: Acute static

GLP: No

Year completed: 1994

Species: *Pimephales promelas*

Supplier: Aquatic Biosystems, Inc., Fort Collins, CO.

Analytical monitoring: Temperature, pH, and dissolved oxygen.

Exposure period: 96-hours

Statistical methods: LC₅₀ values were calculated by the Trimmed Spearman-Kärber method.

Test fish age: Juveniles (53 days)

Length and weight: Average length = 16 mm
Average weight = 0.0276 g (wet)

Loading: 0.276 g/L

Pretreatment: None.

Test conditions:

Dilution water: Carbon-filtered well water (3M Well #2, St. Paul, MN)

Dilution water chemistry: Not given.

Lighting: Not given.

Stock and test solution preparation: The test material was added directly to the dilution water on a weight/volume basis.

Concentrations dosing rate: Once.

Stability of the test chemical solutions: Not noted.

Exposure vessels: 1 L vessels containing 1 L test solution.

Number of replicates: 2.

Number of fish per replicate: 10.

Number of concentrations: five plus a blank control

Water chemistry during the study:

pH range (0-96 hours):

8.0 – 8.3 (control exposure)

8.0 – 8.3 (560 mg/L exposure)*

Temperature range (0-96 hours): 19.5 – 20.5 °C

Dissolved oxygen range (0-96 hours):

6.8 – 8.5 mg/L (control exposure)

3.6 – 8.5 mg/L (560 mg/L exposure)*

* 560 mg/L (second highest concentration) exposure values used because the highest concentration used resulted in total mortality by 24 hours.

RESULTS

Nominal concentrations: Blank control, 100, 180, 320, 560, and 1000 mg/L

Element values: 96-hour LC_{50} = 750 mg/L (CI not calculable)

Element values based on nominal concentrations

Remarks: Testing was conducted on a mixture as described in the Test Substance Remarks field. The values reported apply to that mixture and not the fluorochemical proportion alone.

CONCLUSIONS

The FC-603F 96-hour LC_{50} for fathead minnow was determined to be 750 mg/L.

Submitter: 3M Company, Environmental Laboratory, P.O. Box 33331, St. Paul, Minnesota, 55133

DATA QUALITY

Reliability: Klimisch ranking = 2. This study meets the criteria for quality testing. However, sample purity was not properly characterized and the study lacks analytical confirmation of the amount of fluorochemical proportion in the solution.

REFERENCES

This study was conducted by the 3M Company, Environmental Laboratory, St. Paul, MN, Lab Request number M1655, 1994.

OTHER

Last changed: 6/26/00

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ENVIRONMENTAL LABORATORY

LR: M1655

Date: 5/27/94

Analyst: JBD

Pimephales promelas 96-hour Toxicity Test Data Summary

SAMPLE: FC-603F (Lot #501)

Sample Conc. (mg/L)	Percent Mortality			
	24 hours	48 hours	72 hours	96 hours
100	0	0	0	0
180	0	0	0	0
320	0	0	0	0
560	0	0	0	0
1000	100	100	100	100

LC50 Estimation Method: Trimmed Spearman-Kärber

24 h LC50 (95% C.I.) = 750 mg/L (Not Calculable)
48 h LC50 (95% C.I.) = 750 mg/L (Not Calculable)
72 h LC50 (95% C.I.) = 750 mg/L (Not Calculable)
96 h LC50 (95% C.I.) = 750 mg/L (Not Calculable)

002450

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ENVIRONMENTAL LABORATORY

LR M1655

96-HR ACUTE TOXICITY TO FATHEAD MINNOW, *PIMEPHALES PROMELAS*

TYPE TEST: STATIC X STATIC RENEWAL

TEST SUBSTANCE: FL-603F (Lot #501)

DILUTION WATER: CARBON-FILTERED WELL WATER (3M WELL #2, ST. PAUL, MN)
TEMP. 20 °C, pH 8.0, D.O. 8.5 mg/L

TEST FISH SOURCE: Aquatic Biosystems, Inc.
Fruit Collins, CO DATE RECEIVED: 4-22-94

FISH AGE: 53 days AVG. WT.: 0.0276 ± 0.0099 AVG. SIZE: 1.6 ± 0.2 cm

NO. OF FISH/TEST CHAMBER: 10 LOADING RATE: 0.2765/L

TEST SOLUTION VOLUME: 1L SIZE OF TEST VESSELS: 1L

DATE INITIATED: 5-23-94

DATE TERMINATED: 5-27-94

TEST VESSEL	INITIAL CONC. mg/L	TOTAL AMOUNT ADDED*	MORTALITY											
			24-HR	pH	D.O. mg/L	48-HR	pH	D.O. mg/L	72-HR	pH	D.O. mg/L	96-HR	pH	D.O. mg/L
BK1	CONTROL	-	0	8.3	7.5	0	8.1	7.4	0	8.1	6.4	0	8.3	6.9
BK2	CONTROL	-	0	8.2	7.3	0	8.1	7.1	0	8.1	6.8	0	8.3	7.1
1	100	0.1	0	8.2	7.3	0	8.1	6.4	0	8.1	6.7	0	8.3	6.8
2			0	8.4	7.1	0	8.2	6.9	0	8.2	6.5	0	8.3	6.3
1	180	0.18	0	8.1	6.1	0	8.1	6.1	0	8.1	6.6	0	8.2	5.6
2			0	8.2	6.2	0	8.1	6.5	0	8.1	6.8	0	8.2	5.6
1	320	0.32	0	8.3	6.0	0	8.1	5.2	0	8.1	6.2	0	8.1	5.2
2			0	8.2	7.2	0	8.1	6.2	0	8.1	5.6	0	8.2	5.9
1	560	0.56	0	8.2	7.0	0	8.1	5.4	0	8.1	4.9	0	8.1	5.0
2			0	8.3	6.6	0	8.1	5.8	0	8.0	4.6	0	8.0	3.6
1	1000	1.0	10	8.2	6.7	-	-	-	-	-	-	-	-	-
2			10	8.2	7.4	-	-	-	-	-	-	-	-	-
1														
2														
1														
2														
1														
2														

TEMP. °C 19.5 20 20 20.5
DATE / ANALYST 5-24-94 / JBD 5-25-94 / JBD 5-26-94 / JBD 5-27-94 / JBD

LC50 (95% C.I.) 96 hr LC50 = 150 mg/L (95% C.I. could not be estimated)

COMMENTS *g. Individual weights method - specimen number

Env. pH highest conc. tested (1000 mg/L) = 8.0

SECONDARY EFFECTS: S = Surfacing; E = Loss of Equilibrium; O = Quiescent; R = Erratic Swimming; H = Hemorrhaging

ANALYST: JBD

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M1655

BURLINGTON RESEARCH, INC.
 TRIMMED SPEARMAN-KÄRBER METHOD FOR CALCULATION OF
 EC50 AND LC50 VALUES IN BIOASSAYS

FOR REFERENCE, CITE

N.A. HAMILTON, R.C. RUSSO, AND R.V. THURSTON, 1977
 TRIMMED SPEARMAN-KÄRBER METHOD FOR ESTIMATING MEDIAN
 LETHAL CONCENTRATIONS IN TOXICITY BIOASSAYS
 ENVIRON. SCI. TECHNOL. 11(7): 714-717
 CORRECTION 12(4): 417 (1978)

DATE 5/27/84

TESTER M1655

CHEMICAL EC-5032 (50% EC-50)

SPECIES F. promelas

DURATION 96 hours

RAW DATA

CONCENTRATION (mg/L) 100.00 50.00 25.00 12.50 6.25 3.12 1.56 0.78 0.39 0.19 0.09 0.04 0.02 0.01

NUMBER EXPOSED 10 10 10 10 10 10 10 10 10 10 10 10 10 10

MORTALITIES 0 0 0 0 0 0 0 0 0 0 0 0 0 0

SPEARMAN-KÄRBER TRIM 0.50 0.50 0.50 0.50 0.50 0.50 0.50 0.50 0.50 0.50 0.50 0.50 0.50 0.50

SPEARMAN-KÄRBER ESTIMATES 100.00 50.00 25.00 12.50 6.25 3.12 1.56 0.78 0.39 0.19 0.09 0.04 0.02 0.01

ARE NOT RELIABLE